PCIA Personal Communications Industry Association

July 10, 1997

William F. Caton
Acting Secretary
Federal Communications Commission
Room 200, 1919 M Street, NW
Washington, D.C. 20554

Re: Ex Parte Notification
CC Docket No. 94-102

Dear Mr. Caton:

The purpose of this letter is to notify the Commission, pursuant to Section 1.1206(a)(2) of the Commission's Rules, that on July 10, 1997, Craig Krueger, of the Personal Communications Industry Association hand-delivered industry responses to questions received from the Policy and Rules division of the FCC's Wireless Telecommunications Bureau. These responses were hand-delivered to the following Wireless Bureau staff: John Cimko, Daniel Grosh, David Wye, Nancy Boocker, Won Kim, and Ron Netro.

Should you have any questions regarding the matter, please call me.

Respectfully submitted,

Craig A. Krueger
Manager Government Relations-Federal Affairs

• 500 Montgomery Street • Suite 700 • Alexandria, VA 22314-1561 •
• Tel: 703-739-0300 • Fax: 703-836-1608 • Web Address: http://www.pcia.com •

PCIA *Personal Communications Industry Association*

July 10, 1997

Mr. John Cimko
Chief, Policy Division
Wireless Telecommunications Bureau
Federal Communications Commission
2025 M Street, N.W.
Washington, D.C. 20554

Re: CC Docket 94-102

Dear Mr. Cimko:

On behalf of the Wireless E911 Coalition (Coalition) attached is our response to the questions your office prepared regarding technical capabilities of CMRS providers regarding some of the Phase I E911 requirements. The following companies are members of the Coalition and participated directly in the development of the attached response.

PCIA	BellSouth	Nortel
Omnipoint Communications	Ericsson	Motorola
PrimeCo Personal Communications	Sprint Spectrum, L.P.	

It should be noted that the technical capabilities described herein represent general capabilities of individual technologies, but could vary by vendor and by switch. Additionally, any request to change the technical capabilities described in the attached document could require significant time and effort to complete.

Finally, it is important to point out that due to the fundamental nature of wireless technology we would like the FCC to consider the following:

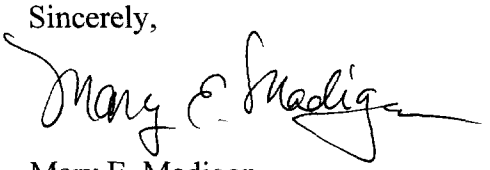
1. Only when a fully validated subscriber is service initialized and registered on the serving network can the phase I requirements of subscriber information and call-back number be fully met by all technologies.
2. The FCC's definition of code identified is problematic for all technologies either because it is not applicable to the way the technologies operate or the switch does not have the capability to determine whether the number is a NANP number or not. For these reasons the FCC should abandon the definition of "code identified" as a differentiator for calls transmitted to a PSAP and base its requirements on either "all calls" or "successfully validated calls".

• 500 Montgomery Street • Suite 700 • Alexandria, VA 22314-1561 •
• **Tel:** 703-739-0300 • **Fax:** 703-836-1608 • **Web Address:** http://www.pcia.com •

3. The technical reality of the radio environment - that there is no way to map or mold cell site location and radio coverage to PSAP boundaries - is the primary reason that PSAP by PSAP choice of call acceptance is unworkable and must be changed.
4. Since there is currently no liability protection for wireless carriers, many wireless carriers choose to pass all calls to the PSAP. This absence of liability protection unnecessarily exposes wireless carriers to the very real possibility of lawsuits from the public sector. It is the opinion of the Coalition that the FCC should create some form of a federal "safe harbor" to protect carriers that do not process an emergency call in accordance with any current or future FCC rules.

We look forward to meeting with you to review the attached document in detail and to work with you to address these considerations and concerns.

Sincerely,



Mary E. Madigan
Vice President, External Affairs

Response to FCC Questions for All Technologies

1. What are the relevant technologies, services, and switch vendors:

Technology	Service	Vendor[1]
AMPS/TDMA	Analog, digital cellular, PCS	Ericsson, Lucent, Motorola, Nokia, Nortel, Hughes
CDMA	Digital cellular, PCS	Lucent, Motorola, Nortel, Qualcomm
PCS1900, the North American variant of GSM[2]	Digital PCS	Ericsson, Motorola, Nortel, Nokia, Siemens
iDEN	ESMR	Motorola, Nortel

2. For each of these technologies, what codes are programmed into the handset and transmitted to the cell site or switch?

For all technologies -- *This response provides information on only those codes which enable a switch to recognize a handset.*

AMPS

ESN - Electronic Serial Number - this is a 32 Bit code hard coded into the handset **by the manufacturer**. It is made up of an 8 bit manufacturer code and a 24 bit number that is unique to the handset.

MIN - Mobile Identification Number - A 34 bit code used **by the carrier or retail center** to program the subscriber's telephone number into the handset. The manufacturer initially populates this field with a default value that is not unique to individual handsets and does not follow NANP conventions. The values populated vary from manufacturer to manufacturer.

The MIN is subsequently populated with a number conforming to the **NANP by the retail center or carrier** prior to service activation.

TDMA

ESN - Same as AMPS above

MSID - Mobile Station Identifier - Made up of either a 34 bit MIN, 50 bit IMSI, or a 20 or 24 bit TMSI.

MIN - same as AMPS above

IMSI - International Mobile Station Identifier* (assignable by the carrier)

TMSI - Temporary Mobile station Identifier* (does not reside permanently in the handset - it is dynamically assigned temporarily by the Mobile Switching Center (MSC))

*The IMSI and TMSI are not used in today's TDMA systems. In the future they may be implemented to facilitate international roaming, network traffic and fraud control.

Default values are assigned to the MSID **by the manufacturer**. The MIN is subsequently populated with a number conforming to the NANP **by the retail center or carrier** prior to service activation.

CDMA

ESN - Electronic Serial Number - This is a 32 Bit code hard coded into the handset **by the manufacturer**. Most use the AMPS scheme. But some are made up of a 14 bit manufacturer code and a 18 bit number that is unique to the handset.

---

[1] In addition, there are multiple vendors, both small and large, for handsets (e.g., Mitsubishi and Sagem for PCS1900)

[2] For simplicity of this document, the PCS1900 technology is referred to as GSM in the technology headings.

MIN - Mobile Identification Number - A code used **by the carrier or retail center** to program the subscriber's telephone number into the handset. The manufacturer initially populates this field with a default value that is not unique to individual handsets and does not follow NANP conventions (i.e., the value could be defaulted to all zeros). The values populated vary from manufacturer to manufacturer.

The MIN is subsequently populated with a number conforming to the NANP **by the retail center or carrier** prior to service activation.

GSM

By the handset manufacturer – the International Mobile Equipment Identity (IMEI), a number made up of three components: the Type Approval Code (TAC) issued by the GSM North America; the Final Assembly Code (FAC) designing the manufacturing facility; and the serial number of the unit which comes from a pool of numbers allocated to a manufacturer.

By the retail center – None

By the carrier – the International Mobile Subscriber Identity (IMSI) which is not in the handset but in the Subscriber Identity Module (SIM) card. The IMSI is an ITU-T E.212 number composed of the 3 digit Mobile Country Code (MCC) and the 3 digit Mobile Network Code (MNC) which are allocated by the North American Numbering Council and nine digits that are operator designated. The SIM is a removable module (card or disk) containing the IMSI, TMSI and algorithms used for authentication and encryption.

NOTE: a Mobile Subscriber Integrated Services Digital Network (MSISDN) number is also assigned **by the carrier** but not transmitted from the handset to the switch or used to identify either the handset or the subscriber.

By the network – —a Temporary Mobile Subscriber Identity (TMSI) which is temporarily assigned to a subscriber by the network, as a replacement for the IMSI.

iDEN

By the handset manufacturer - the IMEI (International Mobile Equipment Identity).

This 15 digit number is a unique identification describing the Mobile Station equipment by type approval code, final assembly code and serial number. When the mobile is first powered on it will register with the Service Provider (Carrier) using the IMEI. Upon initial registration the Service Provider will assign an IMSI (International Mobile Subscriber Identity) to the subscriber unit. Once the IMSI has been assigned the subscriber unit will not transmit the IMEI over the air.

By the retail center – None

By the carrier - The IMSI (International Mobile Subscriber Identity) is an ITU-T E.212 fifteen digit number with the format of a 3 digit Mobile Country Code, 3 digit Mobile Network Code, and 9 digit Service Domain Code and Subscriber Number. An example of an iDEN IMSI is: 316010333322222.

In order to protect the subscriber unit identity (IMSI), a TMSI (Temporary Mobile Subscriber Identity) is assigned to the subscriber unit by the Service Provider.

The subscriber unit uses the TMSI to communicate with the MSC. This TMSI changes over time and circumstances with new TMSIs being assigned on a periodic basis by the Service Provider. The Service Provider can always query the mobile for the IMSI if the TMSI is outdated or not recognized.

The service Provider also assigns a North American Numbering Plan Telephone Directory Number to be used to reach the subscriber unit from the PLMN (Public Land Mobile Network). This telephone number exists only in the network and is NOT used to communicate between the MSC and the subscriber unit.

Summary:

- The handset manufacturer programs an IMEI into the subscriber unit
- The retail center arranges for service
- The carrier assigns the IMSI, TMSI, and NANP Telephone Directory Number.

3. What is the source of these codes?

AMPS/TDMA

ESN - first 8 bits contain a code identifying the manufacturer, assigned by the FCC. The remaining 24 bits represent a decimal serial number assigned by the manufacturer. The combination of these two create

a unique ESN for each handset.

MIN - When a handset comes from the manufacturer it contains a default MIN created by the manufacturer for uses specific to the manufacturer. The default MIN does not necessarily conform to NANP or any other standard or source and may be unique for each manufacturer. The manufacturer's default MIN is replaced by the carrier or retail center with a 10 digit telephone number conforming to the NANP. The numbers are obtained by the carrier from the local NANP administrator.

CDMA

ESN - Same as AMPS/TDMA except that some phones in service use a 14 bit manufacturer code and an 18 bit serial number.

MIN - When a handset comes from the manufacturer it contains a default MIN created by the manufacturer for uses specific to the manufacturer. The default MIN does not necessarily conform to NANP or any other standard or source and may be unique for each manufacturer. The manufacturer's default MIN is replaced by the carrier or retail center with a 10 digit telephone number conforming to the NANP. The numbers are obtained by the carrier from the local NANP administrator.

GSM

IMEI – is a number made up of three components: the Type Approval Code (TAC) issued by the GSM North America; the Final Assembly Code (FAC) designing the manufacturing facility; and the serial number of the unit which comes from a pool of numbers allocated to a manufacturer. This number does not correspond to any specific numbering plan.

IMSI – is an ITU E.212 number composed of the Mobile Country Code (MCC) and the Mobile Network Code (MNC) which are allocated by the North American Numbering Council and nine digits that are operator designated. This number is a unique identity allocated to each subscriber in the GSM system. This number is structured so that the home GSM network of the subscriber is uniquely identified. This number is not in the North American Numbering Plan (i.e., this means that this number cannot be used to route calls). This number is not usable in a Public Switched Telephone Network (PSTN)/Integrated Services Digital Network (ISDN).

TMSI -- a Temporary Mobile Subscriber Identity (TMSI) is temporarily assigned to a subscriber by the network, as a replacement for the IMSI. The TMSI is used to identify the subscriber to the network and is periodically changed by the network.

MSISDN - is a number associated with a service subscription. The number comforms to the North American Numbering Plan and can be used for call back. The MSISDN is associated with a particular IMSI or TMSI in a database in the PCS1900 network.

iDEN

Same as GSM above

4. Which of these codes or combinations of codes uniquely identify the handset and subscriber?

AMPS/TDMA/CDMA

The ESN uniquely identifies a handset (unless the ESN has been illegally cloned to another handset). Both the ESN and a MIN that has been populated by the carrier with a NANP number are needed to uniquely identify the handset and the subscriber for purposes of validating a subscriber to make and receive calls.

GSM

In a GSM environment the IMEI can identify a handset and the IMSI or TMSI can uniquely identify a subscriber account. However, these identifiers are of significance only to a GSM carrier. Without further processing by the carrier, associating the IMSI or TMSI with an MSISDN, the IMEI and/or the IMSI provide no call-back or subscriber identification capabilities.

iDEN
Same as GSM above

5. Which of these codes or combination of codes can be used for call back by a PSAP—Directly, as in the case of a NANP code---Indirectly through database lookup?

For all technologies --- *This response is based on the assumption that any necessary upgrades or enhancements required in the LEC and PSAPs systems have been made. Currently, most wireless carriers route 911 calls to a LEC 911 tandem for termination to the PSAPs and do not route calls directly to PSAPs. Therefore, the LEC must be capable of transmitting the information and the PSAP must be capable of receiving the information. The extent of upgrades will be dependent upon the Phase I solution deployed and the current LEC and PSAP equipment capabilities.*

AMPS/TDMA/CDMA
A MIN that has been populated by a carrier with a unique NANP number is required for a PSAP to call back the user. This population of the MIN field with a unique NANP number allows the carrier to send usable ANI information on a 911 call.

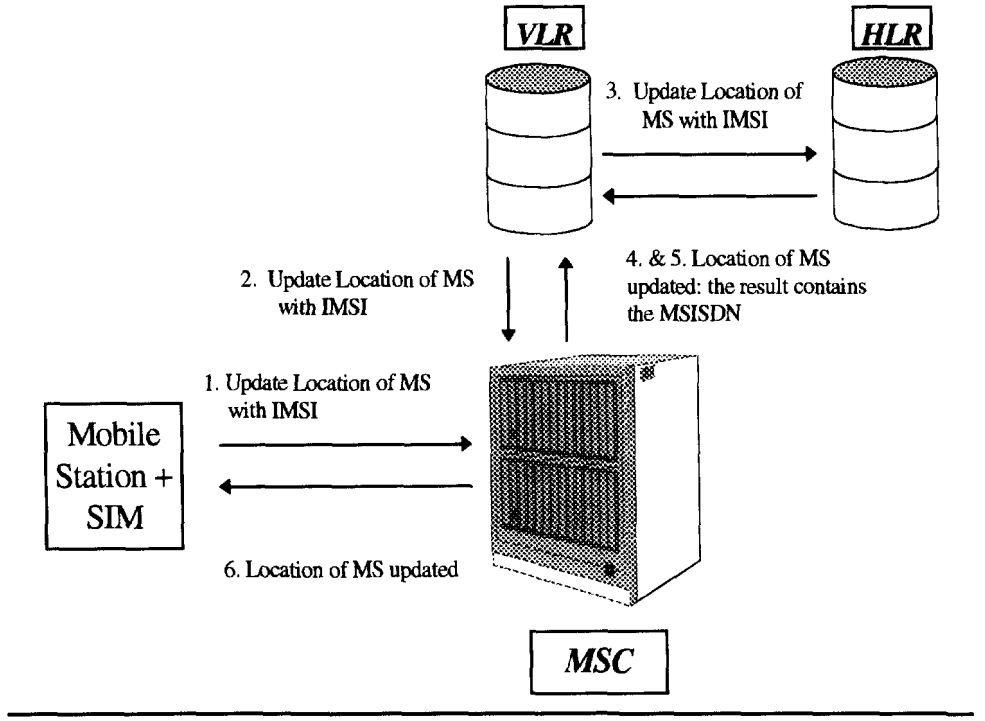
In addition, the user must be an active subscriber, in good standing, to receive calls, must be "reachable" by his home carrier if he is roaming,(i.e. automatic roaming agreement or manual authorization) and the subscriber may not have a pre-subscribed feature or carrier assigned feature that prevents/denies call terminations and/or a feature activated that re-routes incoming calls.

Also, if other handsets exist which carry the same MIN as the active subscriber's handset (such as in the case of cloning) there is no guarantee which handset would receive the call back if both handsets were turned on.

GSM
In a GSM environment the IMEI and/or the IMSI do not provide a PSAP with call back capabilities. To support this function a GSM carrier uses the IMSI for a database lookup, obtaining the MSISDN. The MSISDN conforms to the North American Numbering Plan, is a dialable number and resides in a database within the network. The MSISDN is only available if there is a subscription associated with the IMSI and the subscription information is available at the Visited Location Register (VLR) of the serving network. The VLR is populated with the MSISDN and subscriber data when the handset registers (completes a location update) on the serving network. In summary:

- Handset without a SIM - no IMSI available so no information in the VLR and no call back capability
- Handset with a SIM, but non-service initialized - no valid IMSI available so no information in the VLR and no call back capability
- Handset with a SIM card and service initialized - if no serving network registration has been accomplished, no information will be in the VLR and therefore, no call back capability
- Handset with a SIM card, service initialized and registered on the serving network - the MSISDN is retrieved through database lookup and a call back number can be generated

It should be noted that the MSISDN number for an international roamer that is transmitted to a PSAP may not include the country code. This would prevent callback capability to international roamers.



Mobile Subscriber Location Update (Registration)

iDEN

As with GSM, the IMEI and/or the IMSI do not provide a PSAP with callback capabilities. To support this function, a GSM carrier uses the IMSI for a database lookup, obtaining the MSISDN. The MSISDN conforms to the North American Numbering Plan, is a dialable number and resides in a database within the network. The MSISDN is only available if there is a subscription associated with the IMSI and the subscription information is available at the Visited Location Register (VLR) of the serving network. The VLR is populated with the MSISDN and subscriber data when the handset registers (completes a location update) on the serving network. Therefore, only the NANP Directory Number can be used by the PSAP to call back the subscriber. There is no method within iDEN by which the PSAP can use a non-directory number to call back the subscriber unit.

6. Describe the validation process for each technology. Is there more than one validation, e.g., for service initialization, credit worthiness, etc.?

For all technologies – *For this response, validation assumes that a common air interface exists between the handset and the carrier's system, i.e., CDMA handset and CDMA system. Also, this response only addresses validation for mobile call originations and not call terminations. For calls that are not put through the validation process, see questions 7 and 8 below.*

AMPS/TDMA/CDMA

It should be understood that although the explanation below groups the different steps of validating a mobile into levels, the validation process is currently not capable of determining partial- compliance: Basically, the mobile/subscriber is fully compliant and is allowed to process calls or the mobile/subscriber is not compliant and is not allowed to process calls.

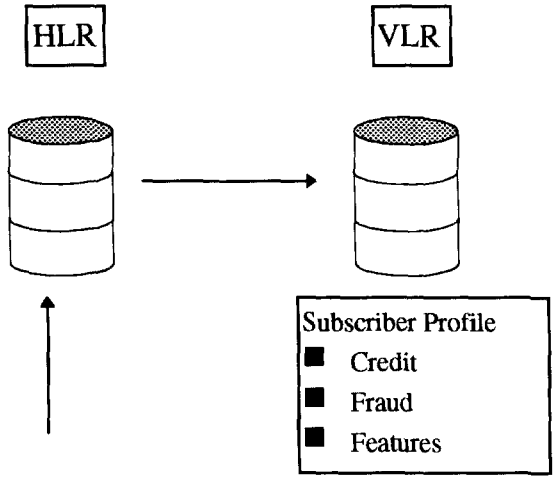
Home Market Validation:

The first level of validation that takes place in a system is to check if the mobile subscriber has a service agreement with the wireless carrier: The mobile's MIN and ESN are used to perform the validation. This

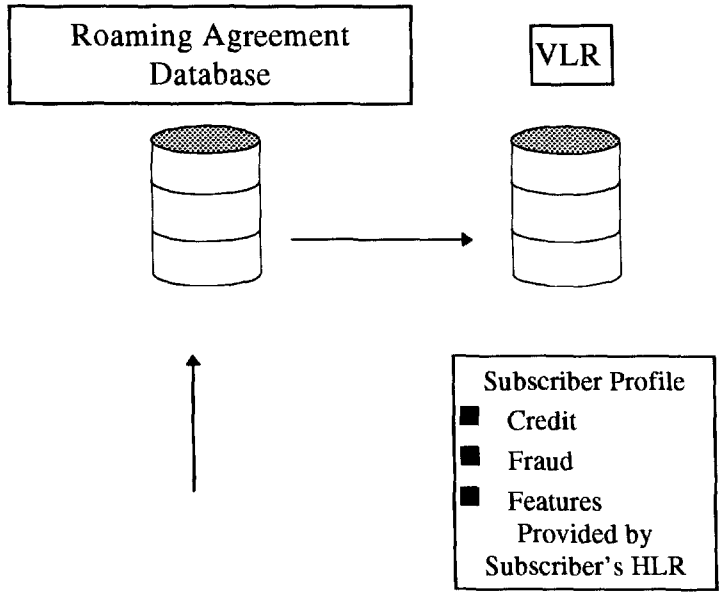
is done by a table lookup using the MIN and ESN. The second level of validation involves credit worthiness checks by checking the subscriber's profile. The third level of validation performs whatever fraud prevention features exist on the system, for example, requiring a PIN to originate calls or performing authentication.

Roaming Market Validation:

The first level of validation in the system is to check if the mobile subscriber's home market has a roaming agreement with the visited system. This is done by looking at a MIN range (NPA-NXX) in a table. The mobile's MIN is used to perform this check. The second level of validation uses both MIN and ESN to perform a credit worthiness check, and the third level of validation performs whatever fraud prevention features exist on the system, for example, requiring a PIN to originate calls or performing authentication.



Home Market Validation



Roaming Market Validation

GSM

A handset can register on a network without an associated subscription. This allows a new handset to communicate with an operator's customer care center to initiate a subscription. At this time, the handset can also make a 911 call. Even though this situation meets the criteria of code-identified, it has no subscription information or callback capability.

Service activation takes place when the network or the user makes a regular call to the Customer Care Center (the criteria for the network may be based on pre-service initialization number of accesses, on pre-service initialization credit time etc.). This regular call is routed to the customer care center where subscriber related information is acquired and used to identify the user, to define a service profile and to activate the service accordingly. When the service is defined, one or several MSISDNs are associated to that IMSI. The subscriber and his/her SIM can be declared service-initialized.

A roaming unit is validated when he first turns on his handset in the visited network or enters a new service area. The system performs a location update and service validation. This action is successful if he is a valid subscriber on a network with a roaming agreement in place.

iDEN

For validation during non-emergency call establishment the MSC will request the subscriber unit to authenticate using a unique key. If the unit authenticates and no further subscriber fraud prevention requirements are identified (i.e. PIN), the subscriber unit is capable of originating calls.

A roaming subscriber unit is validated with information received from its Home Location Register.

7. Can the wireless switch pass calls to PSAPs based on whether one or more of these codes is initiated in the handset? Which ones? Does this answer differ because, e.g., of the model of the switch, software, or other factors?

AMPS/TDMA/CDMA

In today's environment, the choice to deliver all or only validated calls is currently made as a business decision. Some companies/markets are currently allowing all calls and others do not.

As discussed in response to question 8 below, the information coded in the handset is only of relevance if the switch is set to pass only validated calls. In this case the MIN and ESN programmed in the handset must be such that they pass all system validation checks as described in the response to question 6.

If the switch is set to pass all calls (i.e. calls are not validated) then all calls are allowed to pass regardless of:

-the MIN value programmed into the handset

-the ESN value programmed into the handset

-the subscriber having a service agreement with the carrier

-the subscriber's home market having a roaming agreement in place with the visited system

-bad credit

-the mobile being a clone

-pre-subscribed call origination prevention features

GSM

Passing the call to the PSAP is not dependent on whether or not any of the numbers (codes) are initiated in the handset. That is, a 911 call can be passed:

a) if the handset has only registered on the network (initiated a turn on),

b) with no IMSI (or SIM) in the handset,

c) when the caller is service initialized but not validated, or

d) when the subscriber is fully validated.

However, only when the subscriber is service-initialized and registered on the serving network can the subscriber information and callback number be transmitted to the PSAP.

iDEN

The wireless switch is capable of passing calls without validation to PSAPs from a subscriber unit with an IMSI. The need for an IMSI is based on the software logic programmed into the subscriber units. The only case when a subscriber unit will not have an IMSI after the initial power up is when the subscriber unit has been stolen from the warehouse.

8. It has been suggested to us that wireless switch technologies generally allow only two choices in the handling of 911 calls – either all calls are transmitted or only calls that are *successfully validated* can be transmitted. This is inconsistent with the understanding of the Commission in the Order which required that code identified calls be transmitted.

For all technologies

The FCC's definition of Code- Identified is problematic for all technologies because it is not applicable to the way the technologies operate or the switch does not have the capability to determine whether the number is a NANP number or not. For these reasons, the FCC should abandon the concept of code-identified as a differentiator for calls transmitted to the PSAP and base its requirements on either all calls or validated calls.

- **Do you consider it impossible, at the present time, for wireless switches to route all 911 calls from handsets that are code-identified to PSAPs? For which technologies?**

AMPS/TDMA/CDMA

Response to this question is broken out into Two Parts below:

(A.) **Do you consider it to be impossible, at the present time, for wireless switches to route all 911 calls to PSAPs? (whether code-identified or not)**

It is possible at the present time for wireless switches to route all 911 calls to a PSAP because validation checks are not required to be performed for 911 calls today. All calls can be allowed to pass through regardless of:

- the MIN value programmed into the phone
- the ESN value programmed into the phone
- the subscriber having a service agreement with the carrier
- the subscriber's home market having a roaming agreement in place with visited system
- bad credit
- the mobile being a clone
- pre-subscribed call origination prevention features

(B.) **Do you consider it to be impossible, at the present time, for wireless switches to route all 911 calls from handsets that are code-identified to PSAPs?**

The response to this question assumes "code-identified" implies a 10-digit number derived from the NANP.

Yes, because the system is not intelligent enough to determine if:

- the MIN value programmed into the phone is a 10-digit number
- the MIN value programmed into the phone follows the NANP

GSM

Yes, based on the current FCC definition of code-identified, with PCS1900 (GSM), it is not possible to route calls from a code-identified handset, because there is no code or number in the PCS1900 technology that equates to that definition.

iDEN

As with GSM, based on the current FCC definition of code-identified, there is no code or number used in the iDEN network that equates to "code-identification". While the NANP Directory Number is available in the subscriber unit for subscriber viewing, the unit does not use this number when communicating with the MSC.

- **In the all calls scenario, can you perform a subsequent validation once a call has been passed to the PSAP?**

For all technologies - No, this required wireless switch modification would be incompatible with the normal call processing path.

- **Is it possible to modify switch software to route code-identified calls?**

AMPS/TDMA/CDMA

The response to this question assumed "code-identified" implies a 10-digit number derived from the NANP

There is no intelligence built into the switch to distinguish a MIN belonging to the NANP and a MIN that does not. This level of digit analysis would require incredibly large and complex processing capability, database administration and database size. Management by exception is not practical because it is impossible to anticipate the range of numbers that could populate the MIN field. Examples include: the possibility of cloned phones; disconnected phones; numbers installed by the manufacturers, etc. By requiring the MIN to comply to a 10-digit number derived from the NANP, international roaming subscribers may be automatically restricted from placing E911 calls while roaming in the U.S. and its territories.

GSM

The response to this question assumed "code-identified" implies a 10-digit number derived from the NANP

Based on the current FCC definition of code-identified, with PCS1900 (GSM), it is not possible to route calls from a code-identified handset, because there is no code or number in the PCS1900 technology that equates to that definition.

iDEN

As with GSM, based on the current FCC definition of code-identified, it is not possible to route calls from a code-identified handset, because there is no number used between the MSC and subscriber unit that equates to that definition.

- **In a scenario where the wireless carrier is attempting to validate calls (as opposed to sending all calls and bypassing the validation process), is it possible to disregard the result of a validation attempt for E911 calls? What would you gain by doing this as opposed to just doing all calls?**

For all technologies

Some, but not all switches deployed today do attempt to validate all calls and ignore the results when the validation fails. This is the result of development choices made by individual switch manufacturers. . This capability achieves the same practical result as "just doing all calls" without any validation. The already existing process does not delay the progress of the call to the PSAP and results in all calls being

sent.

On other switches, the software could potentially be enhanced to disregard the validation result if the call was a 911 call. However, there are various levels of validation performed and it would have to be clearly understood which validation results should be overridden. Before any validation checks are performed, the system knows immediately that the call is a 911 call by evaluating the dialed digits, and this is why today, all 911 calls can be allowed to pass through. If in fact the plan is to override validation checks in order to allow 911 calls to pass through, then there is no point in performing a validation since the system knows up front the call is of an emergency nature; it will simply be a waste of time and processing to perform the validation only to override it later.

It will have to be clearly understood which part of the validation should be overridden because there are different levels of validation that occur to determine if a subscriber is valid and the validation process is not split up to determine partial or full compliance. In the case of AMPS/TDMA/CDMA, in order to validate a mobile, the following items are verified:

- the MIN value programmed into the phone is a 10-digit number
- The ESN value programmed into the phone
- the subscriber has a service agreement with the carrier
- the subscriber's home market has a roaming agreement in place with visited system
- the subscriber does not have bad credit
- the mobile is not a clone
- the subscriber does not have any pre-subscribed call origination prevention features

For roamers, validation generally requires a successful data communication with the subscriber's home service provider.

9. It has been suggested that if only service initialized calls are routed to PSAPs, the calls must be validated for some technologies, e.g., AMPS and CDMA.

- **Is this correct?**

AMPS/TDMA/CDMA

Yes, only with validation is it possible to differentiate a service initialized mobile from a clone or a mobile whose service initialized subscription has lapsed. But the validation process is not split up to determine partial or full compliance. The validation process currently verifies the subscriber has a service agreement with the carrier or that the subscriber's home market has a roaming agreement in place with visited system, as well as verifying the subscriber is credit worthy, is not a clone, and has not subscribed to any call origination prevention features.

GSM

No, GSM can route only service initialized calls (handsets with a SIM and a valid IMSI), but only with the fully validated subscriber (the above conditions and registered on the serving network) can subscriber information and callback capability be furnished to the PSAP.

iDEN

Same as GSM above

- **Where calls must validated, what does this mean? For example, if a caller is a roamer without a roaming agreement, would the validation process delay the call? Would the caller be required to provide a credit card number or other information?**

AMPS/TDMA/CDMA

When a call is validated, it is verified that:

- the subscriber has a service agreement with the carrier (uses both the MIN and ESN combined)
- the subscriber's home market has a roaming agreement in place with visited system (initially

uses the MIN and then both the MIN and ESN combined)

- the subscriber does not have bad credit
- the mobile is not a clone
- the subscriber does not have any pre-subscribed call origination prevention features

The validation process itself would not cause any measurable delay. In the case where a caller is a roamer without a roaming agreement, the validation process may be set to block the call if validation fails or the caller may be sent to a credit card validation center. If the carrier has chosen to block such calls, the call is not delayed nor routed anywhere to provide credit card numbers or any other information: the call is just blocked. If the carrier has selected to pass the call on to a credit card verification center, the caller must provide a valid credit card number before the call is passed. This step could create some delay in processing the call compared to a caller that passed validation.

GSM

For PCS1900, validation means the user:

-has a valid subscription on some PCS1900 or GSM system;

-powers up his handset and the serving system queries his home system for subscription information an MSISDN number; and

-the serving system deposits that information in its VLR.

iDEN

Same as GSM above

- **Can some or all switches be set to validate, but ignore the result in the case of 911 calls (in order to avoid delay)?**

See answer in section 8, last bullet above

10. If a switch is set to transmit all 911 calls to PSAPs, can it also transmit (for valid customers): 7 digit ANI, 10 digit ANI, 10 digit ANI and 10 digit pseudo-ANI?

AMPS/TDMA/CDMA

The switch populates the ANI field (with either 7 digits or 10 digits) as part of the call set up. This is true regardless of whether all calls or only validated calls are passed. The usefulness of the ANI characters to the PSAP is dependent on a number of factors. For example, if a 7 digit code is sent and the user is roaming, the area code used by the PSAP will likely be different from the user's and so the call would not go through. Similarly, a call from a handset with a manufacturer's default MIN would not have meaningful data in the ANI field.

It is possible today for switches to place 10 digit ANI and/or 10 digit Pseudo-ANI data on an outgoing call set up message, if the appropriate type of outgoing trunks are used. However, until Phase I is implemented, it is not possible for the PSAP to receive and utilize both pieces of information.

GSM

Certainly, GSM carriers can program switching equipment to route all calls to the PSTN. However, the ability to transmit a 7-digit ANI, 10-digit ANI and or 10-digit pseudo ANI requires service initialization and a validated subscriber.

If the subscriber is a valid roamer and has previously registered in the serving area (MSC/VLR), it should be possible to pull their callback number from the VLR database. Many MSCs (carriers) prefer to perform validation on a per call basis, just to be certain that this is not a fraudulent mobile using the same ID in the same location. For mobiles which have not previously registered (failed validation, just powered up and dialed, etc.) no subscriber information or callback capability will accompany the call passed to the PSAP. See questions 5 and 6 above.

iDEN

7 digit ANI - Yes, the switch can transmit a 7 digit ANI if there is an IMSI to ANI translation in the switch database. If the ANI is not in the switch database it will not be able to send that ANI to the PSAP.

10 digit ANI -Yes the switch can transmit a 10 digit ANI if there is a IMSI to ANI translation in the switch database. If the ANI is not in the switch database it will not be able to send to the PSAP the ANI.

10 digit ANI and 10n digit pseudo ANI - No, not until Phase 1 is implemented, it is either ANI or pseudo ANI, depending upon the PSAP's request.

11. Can the system selectively route calls differently to different PSAPs, e.g. all calls to some PSAPs and only validated calls to others? Does this capability vary depending on the network capability, radio capability, and/or model of switch? The software?

This radio capability response covers all technologies....

If it is determined that switch software should be enhanced to selectively route calls differently to different PSAPs, there are still the radio coverage challenges of overlapping coverage, topology, atmospheric, multipath, and call loading conditions that will preclude the success of this routing method. The two examples provided below signify this:

Cell Site	PSAP	Type Calls Accepted
1	A	All
2	B	Validated

1.If un-initialized mobile X is in Cell Site 1's coverage area, but is locked into Cell Site 2 (due to either topology, atmospheric, multipath, or cell loading conditions) when the mobile originated a 911 call, the call is immediately blocked because PSAP B only wants validated calls (although the mobile is really located in PSAP A's coverage area).

2.If un-initialized mobile X is in Cell Site 2's coverage area, but is locked into Cell Site 1 (due to either topology, atmospheric, multipath, or cell loading conditions) when the mobile originates a 911 call, the call is allowed to go through since PSAP A wants all calls. When PSAP A determines mobile X is really in PSAP B's coverage area, the call will be re-routed to PSAP B. PSAP B will have no way of confirming if this call is from a validated subscriber or not, hence, defeating the reason for performing the validation check in the first place.

In summary, even if either wireless network switches or associated Tandem switches could be modified to selectively route calls to PSAPs with different requirements, the unresolvable challenges of radio coverage issues make such switch modifications moot. The technical reality of the radio environment - that there is no way to map or mold cell site location and radio coverage to artificially created PSAP boundaries - is the primary reason that PSAP by PSAP choice of call acceptance is unworkable and must be changed.

AMPS/TDMA/CDMA

No, all PSAPs must be treated alike. 911 calls are processed through one or the other of two paths. The switch can be set up to pass all 911 calls without validation or to send all 911 calls through the validation process. There are no capabilities for the switch to make a determination on which of these two paths to take based on an individual PSAP (pseudo-ANI).

GSM

No, the switch cannot currently selectively route calls differently to different PSAPs. This limitation does not depend on switch model.

iDEN

No, the switch, based on the software, can not route validated calls to one PSAP and all calls to another PSAP when both PSAPs are within the domain of the same switch. Each switch may be set to route all calls OR validated calls. To change this is to write new software for the switch. However, even with new switch software, the radio coverage will still be an issue.

12. Do you believe more time will be needed to successfully implement :

- **Basic 911 requirements**
- **E911 Phase I**

If so, how much time?

More time is not needed to successfully implement basic 911 requirements.

The need for an extension for Phase 1 will be directly related to what, if any, changes the FCC determines are appropriate to make to the current E911 requirements. As discussed above, some E911 requirements could require a significant amount of technical development. Therefore, until we know the scope of the requirements, it is impossible to establish a time frame for accomplishing those requirements. The Coalition will discuss this issue in more detail once we know our options. Furthermore, any such discussion would require input from the appropriate standards group developing E911 technical standards for the wireless industry which we would seek prior to providing any recommendation to the FCC.

However, if the FCC were to abandon the concept of PSAP choice and the use of code-identified to define a category of calls that might be sent to a PSAP, the additional time requirement, if any would be minimal.

13. In the Order, the Commission recognized that when non-code identified calls are transmitted to a PSAP, the PSAP may not receive ANI information allowing call back for such calls. It has recently been suggested that if a carrier transmits all 911 calls, including those not code identified, the carrier may be unable to transmit ANI for other calls. In other words, transmission of non-code identified calls might actually impair PSAP callback or other capabilities for service initialized calls from subscribers or roamers.

- **Are there any cases where this would occur?**

AMPS/TDMA/CDMA

ANI will be passed so long as the mobile transmitted some kind of ANI and the system is so configured. In the event the mobile is not service initialized, the ANI sent to the PSAP may not be valid (since it may be all zeros, for instance). In the case where a subscriber no longer has service (i.e. did not renew contract or terminated it), but has mobile that does have a 10-digit MIN which also follows the NANP, although the ANI may appear to be valid, the subscriber will not have callback capabilities since he is not a valid subscriber in any system. Another case where a subscriber no longer has service (i.e. did not renew contact or terminated it), but has a mobile that does have a 10-digit MIN which also follows the NANP and phone number was re-assigned to another subscriber, the other subscriber may actually receive the PSAP's callback if the MIN and ESN are valid.

In addition, although the ANI information - which is necessary for callback - is passed to the PSAP, this information by itself is not sufficient to ensure that callback will occur successfully. There must also be a roamer agreement between the serving wireless carrier and the subscriber's home system. Furthermore, communication between the serving and home systems must also occur successfully, with a positive result regarding the roaming subscriber's authorization to place and receive calls (as allowed by the home system based on credit status, fraud checks, call delivery not being de-activated by the roamer, etc.).

The transmission of non-code identified calls should not impair the transmission of code identified calls.

GSM

If all calls are passed, only the service initialized and validated calls will provide call back and subscriber information. Calls that are made from (1) SIMless handsets, (2) handsets that are not service initialized or (3) handsets that are not validated, can still be passed but with no accompanying information.

iDEN

Within the iDEN system, when the unit is not service initialized nor validated, the call will not send the ANI as it is not available. However, the system will continue to send ANI when it is available from the service initialized and validated subscriber units.

- **If so, under what circumstances, e.g., which switches or vintages of software?**

N/A

- **What causes this effect?**

N/A

- **What remedies would be required to correct this problem and provide callback capability for all service-initialized callers, including roamers without automatic roaming?**

AMPS/TDMA/CDMA

ANI is necessary but not sufficient to assure callback capability. In addition, there must be a valid roaming agreement and signaling between carriers must be in place. Service initialized subscribers will only be able to have callback capability if:

- the subscriber has a service agreement with the carrier
- the subscriber's home market has a roaming agreement in place with visited system
- the subscriber is credit worthy
- the mobile is not a clone
- the subscriber does not have any pre-subscribed or carrier assigned call termination prevention features
- the subscriber does not have any features activated that re-route all incoming calls.

These requirements for callback preclude callback capabilities to roamers without automatic roaming capability, and no known technical enhancement or modification to existing equipment or software will change that preclusion.

GSM

ANI is necessary but not sufficient to assure callback capability. In addition, there must be a valid roaming agreement and signaling between carriers must be in place. Service initialized subscribers will only be able to have callback capability if:

- the subscriber has a service agreement with the carrier
- the subscriber's home market has a roaming agreement in place with visited system
- the subscriber is credit worthy
- the mobile is not a clone
- the subscriber does not have any pre-subscribed or carrier assigned call termination prevention features
- the subscriber does not have any features activated that re-route all incoming calls.

These requirements for callback preclude callback capabilities to roamers without automatic roaming capability, and no known technical enhancement or modification to existing equipment or software will change that preclusion. However, for PCS1900 customers, this should not pose a problem because every

PCS1900 operator in North America has now or soon will have a roaming agreement with every other operator. This should facilitate automatic roaming capability for all PCS1900 technology customers. This will only hold true for the PCS1900 technology, not for a dual mode PCS1900/AMPS combination where roaming agreements with AMPS systems may not exist.

iDEN

As with GSM, ANI is necessary but not sufficient to assure callback capability. Service Initialized subscribers will have callback capabilities if the following is true:

1. The subscriber has a valid subscription with the home carrier
2. The subscriber unit has not been reported stolen
3. No feature for re-routing of incoming calls is active
4. A roaming subscriber's home carrier has a roaming agreement with the visited carrier

14. What if the Commission were to establish a default that required the wireless industry to pass X type calls unless all PSAPs served by a certain switch agreed that they would all rather have Y type of calls, in which case the wireless carrier would have to accommodate the PSAPs? Is this technically feasible?

This response covers all technologies...

Switches can only support one of two options, either pass all calls or pass calls which pass validation. Assuming for discussion purposes that type X means validated calls and type Y means all calls.... It is technically feasible to do this on an individual switch basis, however, problems still exist which would preclude all PSAPs from receiving only those types of calls (either X or Y) that they had agreed upon.

- All wireless carriers operating in a market do not have the same switch coverage footprints. Therefore, carrier A's switch may serve different PSAPs than carrier B's switch. Even if all PSAPs served by carrier A agreed to Y type calls, these same PSAPs served by carrier B's switch would still get type X calls unless all PSAPs served by carrier B got together and agreed to type Y calls. This problem is significant in those areas where a single switch may cover multiple states and a variety of PSAP interests.
- Multiple switches are required to cover populations in some markets. The potential for problems when a subscriber's signal is picked up by a base station homed to a different switch than the base station which normally handles calls in that location. If one switch passes type X calls and the other type Y calls, the subscriber could receive different treatment from what the PSAP designated to serve that location has chosen.
- Problems may also exists in networks where LEC selective routers are used to route/reroute wireless calls. In such cases the LEC would also have to provide this capability and the selective router would be required to implement the same requirements. In other words, it is not technically possible for the wireless carrier to meet this requirement without the support of the wireline carriers.
- A dispute resolution process which is outside the wireless carrier's purview must be in place. If the PSAPs connected to a given switch cannot agree on the type of calls to be received, a way to resolve the conflict must be available and legal protections must be granted to the carrier.
- Finally, the Commission must realize even if all the PSAPs served by a certain switch agreed to the call type accepted, the unresolvable challenges of radio coverage issues does not preclude the possibility of calls being received from a neighboring switch coverage area, with possibly a different call acceptance criteria. The technical reality of the radio environment - that there is no way to map or mold cell site location and radio coverage to PSAP boundaries - is the primary reason that PSAP by PSAP choice of call acceptance is unworkable and must be changed.

Attachment 1

ACRONYMS

ANI---Automatic Number Identification

ESN---Electronic Serial Number

FAC---Final Assembly Code

HLR---Home Location Register

IMEI---International Mobile Equipment Identifier

IMSI---International Mobile Subscriber Identifier

ISDN---Integrated Services Digital Network

LEC---Local Exchange Carrier

MCC--Mobile Country Code

MNC---Mobile Network Code

MIN---Mobile Identification Number

MSC---Mobile Switching Center

MSID---Mobile Station Identifier

MSISDN---Mobile Subscriber Integrated Services Digital Network

NANP---North American Numbering Plan

PLMN---Public Land Mobile Network

PSAP---Public Safety Answering Point

SIM---Subscriber Identity Module

SU---Subscriber Units

TMSI---Temporary Mobile Subscriber Identifier

TAC---Type Approval Code

VLR---Visited Location Register